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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,143	04/07/2004	Shaolin Li	27592-00275-US6	8943

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EXAMINER	
HOLLIDAY, JAIME MICHELE	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/821,143	LI, SHAOLIN	
	Examiner	Art Unit	
	JAIME M. HOLLIDAY	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 December 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-62* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6-8,10-13,20-24,30-32,34,35,37 and 43-45* is/are rejected.

7)☒ Claim(s) *4, 5, 9, 14-19, 25-29, 33, 36, 38-42 and 46-62* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 1, 2009 has been entered.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. **Claims 1-3, 6-8, 10-13, 20-24, 30-32, 34, 35, 37 and 43-45** are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over

claims 1-7 and 15-18 of U.S. Patent No. 7,646,744 B2. Although the conflicting claims are not identical, they are not patentably distinct from each other because the patent claims include all of the limitations of the instant application claims, respectively. The patent claims also include additional limitations. Hence, the instant application claims are generic to the species of invention covered by the respective patent claims. As such, the instant application claims are anticipated by the patent claims and are therefore not patentably distinct therefrom. (See Eli Lilly and Co. v. Barr Laboratories Inc., 58 USPQ2D 1869, "a later genus claim limitation is anticipated by, and therefore not patentably distinct from, an earlier species claim", *In re Goodman*, 29 USPQ2d 2010, "Thus, the generic invention is 'anticipated' by the species of the patented invention" and the instant “application claims are generic to species of invention covered by the patent claim, and since without terminal disclaimer, extant species claims preclude issuance of generic application claims”).

10/821143	7,646,744
Claims 1 and 20	Claim 1
1. **A radio frequency (RF) multi-antenna access point** enhancement circuit comprising: a multi-antenna signal processing circuit configured to be situated in **a first access point** and adapted to: operate with a first baseband processor, **so that the first baseband processor handles data transmissions in a first mode between the first access point and a second access point under a first channel transmission condition** without multi-antenna signal processing by the multi-antenna signal processing circuit, and	1. A method of **operating a radio frequency (RF) signal processing circuit** comprising: establishing **a wireless communications channel between a first access point and a second access point** in accordance with a communications protocol; monitoring transmission conditions in said wireless communications channel, including an available data rate, **to determine whether a first transmission mode or a second transmission mode should be used**; performing a **first set of signal processing operations at said first**

the **multi-antenna signal processor handles data transmissions in a second mode between the first access point and the second access point under a second channel transmission condition**; **receive M independent RF modulated input signals from the second access point when the second channel transmission mode exists between the first access point and the second access point**; and **process the M independent RF modulated input signals** using a channel mixing matrix to extract N independent data signals transmitted by the second access point; wherein the multi-antenna signal processing circuit operates selectively with the first baseband processor to demodulate RF signals received in a channel from the second access point. 20. A **radio frequency (RF) multi-antenna access point circuit** comprising: a baseband processor circuit **adapted to handle for handling data transmissions during a first operating mode in a channel between a first access point and a second access point**; a multi-antenna signal processing circuit for **handling data transmissions during a second operating mode in the channel**, the multi-antenna signal processing circuit being further adapted to: **receive M independent RF modulated input signals from the second access point; and** **process the M independent RF modulated input signals using a channel mixing matrix to extract N independent data signals transmitted by the second access point; wherein the first operating mode and the second operating mode are automatically**	**access point on a single received RF signal from said second access point** when said first transmission mode is used; performing **a second set of signal processing operations,** including at least one operation not included in said first set of signal processing operations, **at said first access point on M independent RF received signals from said second access point when said second mode of operation is used**; wherein data transmissions between said first access point and said second access point are compliant with said communications protocol in both said first transmission mode and said second transmission mode.

selected by the RF multi-antenna access point system based on a transmission condition in the channel; a modulator/demodulator circuit coupled to an antenna assembly and the multi-antenna signal processing circuit and baseband processor circuit for extracting I/Q data samples from an RF modulated received signal; and a media access controller coupled to the multi-antenna signal processing circuit and baseband processor circuit for interfacing to a host computing system, wherein the baseband processor is adapted to operate with the multi-antenna signal processing circuit, and wherein the baseband processor is **configured to handle data transmissions during the first operating mode** without multi-antenna signal processing by the multi-antenna signal processing circuit.	
Claim 2	Claim 2
2. The circuit of claim 1, wherein the multi-antenna signal processing circuit is **enabled and selectively operates in the second mode when channel conditions indicate that a data rate in said channel has fallen below a predetermined threshold.**	2. The method of claim 1, wherein said **second mode is automatically enabled when transmission conditions indicate that a data rate in said channel has fallen below a predetermined threshold**.
Claim 3	Claim 3
3. The circuit of claim 1, wherein the multi-antenna signal processing circuit is **enabled and selectively operates in the second mode in response to a determination that a data rate in the channel is to be enhanced above a nominal operating rate.**	3. The method of claim 1, wherein said second mode is automatically **enabled when transmission conditions indicate that a data rate in said channel is to be enhanced above a nominal operating rate**
Claim 6	Claim 4
6. The circuit of claim 1, wherein the first baseband processor	4. The method of claim 1, wherein said communications protocol is based on an

is compatible with an **802.11x communications protocol.**	**802.11 communications protocol**
Claim 7	Claim 5
7. The circuit of claim 1, wherein a processing latency of the multi-antenna signal processing circuit is compensated using a **dummy data response to maintain compatibility with a transmission protocol** used by the first access point and the second access point	5. The method of claim 1 wherein said second set of signal processing operations introduce a latency, and said latency is compensated using a **dummy data response to maintain compatibility with said communications protocol.**
Claim 8	Claim 6
8. The circuit of claim 1, wherein the multi-antenna signal processing circuit is configured as a **multiple-in, multiple out (MIMO) processor.**	6. The method of claim 1 wherein said second set of signal processing operations is performed by a **multiple-in, multiple out (MIMO) processor.**
Claims 21-24	Claim 7
21. An apparatus comprising: a **multi-antenna signal processing circuit**; a first **baseband processor configured to operate capable of operating substantially with the multi-antenna signal processing circuit**, the first **baseband processor capable of handling configured to handle data transmissions in a first mode**; and the **multi-antenna signal processor configured to handle capable of handling data transmissions in a second mode** **wherein the baseband processor is configured to handle data transmissions** during the first mode without multi-antenna signal processing by the multi-antenna signal processing circuit. 22. An apparatus according to claim 21, further comprising:	7. A method of performing **multi-antenna radio frequency (RF) communications** comprising: performing data transmissions **during a first operating mode in a channel at a first access point using a first baseband processor**; performing data transmissions during **a second operating mode in said channel at said first access point using a multi-antenna signal processing circuit that is not used in said first operating mode**, including the following: **receiving M independent RF modulated input signals from a second access point**; **processing said M independent RF modulated input signals using a channel mixing matrix to extract N independent data signals transmitted by said second access point**; wherein said first operating mode and said second operating mode are automatically selected based on a transmission condition in said

a first access point, including the multi-antenna signal processing circuit and the first baseband processor, configured to transmit or receive capable of transmitting and receiving data in the first mode or the second mode, or combinations thereof; a second access point configured to transmit or receive capable of transmitting or receiving data in the first mode or the second mode, or combinations thereof; the first baseband processor further configured to handle capable of handling data transmissions in the first mode between the first access point and the second access point under a first channel transmission condition; and the multi-antenna signal processor further configured to handle capable of handling data transmissions in the second mode between the first access point and the second access point under a second channel transmission condition. 23. An apparatus according to claim 22, wherein the multi-antenna signal processor is further configured to receive capable of **receiving M independent modulated input signals from the second access point if the second channel transmission condition exists between the first access point and the second access point**. 24. An apparatus according to claim 23, wherein the multi-antenna signal processor is further configured to process capable of **processing the M independent modulated input signals using a channel mixing matrix to extract N independent data signals transmitted by the second access point.**	channel.
Claims 34, 35, 37	Claim 7
34. A communication system comprising:	7. A method of performing **multi-antenna**

a **multi-antenna signal processor processing circuit**; a first baseband processor capable of operating with the multi-antenna signal processor processing circuit, the first baseband processor configured to **handle data transmissions in a first mode**; and the multi-antenna signal processor configured to **handle capable of handling data transmissions in a second mode wherein the first baseband processor is configured to handle data transmissions during the first mode** without multi-antenna signal processing by the multi-antenna signal processing circuit. 35. A communication system according to claim 34, further comprising: a mobile terminal configured to transmit capable of transmitting data to a first and/or second access point; the first access point, including the multi-antenna signal processor and the first baseband processor, configured to transmit or receive capable of transmitting and receiving data in the first and/or second mode; the second access point configured to transmit or receive capable of transmitting and receiving data in the first and/or second mode; the first baseband processor further configured to handle capable of handling data transmissions in the first mode between the first access point and the second access point under a first channel transmission condition; and the multi-antenna signal processor further configured to handle capable of handling data transmissions in the second mode between the first access point and the second access point under a second channel transmission condition.	**radio frequency (RF) communications** comprising: performing data transmissions **during a first operating mode in a channel at a first access point using a first baseband processor**; performing data transmissions during **a second operating mode in said channel at said first access point using a multi-antenna signal processing circuit that is not used in said first operating mode**, including the following: **receiving M independent RF modulated input signals from a second access point**; **processing said M independent RF modulated input signals using a channel mixing matrix to extract N independent data signals transmitted by said second access point**; wherein said first operating mode and said second operating mode are automatically selected based on a transmission condition in said channel.

37. A communication system according to claim 35, wherein the multi- antenna signal processor is further configured to process capable of **processing the M independent modulated input signals using a channel mixing matrix to extract N independent data signals transmitted by the second access point.**	
Claims 10, 30-32, 43-45	Claim 15
10. An **802.1 lx compatible radio frequency (RF) multi-antenna access point** enhancement circuit comprising: a multi-antenna signal processing circuit configured to be situated in a first access point and adapted to: **operate with a first baseband processor, so that the first baseband processor handles data transmissions in a first mode between the first access point in accordance with an 802.11x protocol**, and a second access point under a first channel transmission condition, without multi-antenna signal processing by the multi-antenna signal processing circuit, and the multi-antenna signal processor **handles data transmissions in a second mode between the first access point and the second access point in accordance with an 802.11x protocol under a second channel transmission condition**; **receive M independent RF modulated input signals from the second access point when the second channel transmission mode exists between the first access point and the second access point;** **process the M independent RF modulated input signals** using a channel mixing matrix to **extract N independent data signals transmitted by the second access point;**	15. A method of transmitting and receiving data in a **802.11 compatible communications channel using a plurality of radio frequency (RF) received signals** comprising: operating a first **baseband processor to handle data transmissions in a first mode between a first access point and a second access point in accordance with an 802.11 protocol,** based on a first channel transmission condition; operating a multi-signal processor to handle data transmissions in a second mode between said **first access point and said second access point in accordance with an 802.11 protocol under a second channel transmission condition**, wherein during said second mode said multi-signal processor: i) **receives M independent RF modulated input signals from said second access point; ii) processes said M independent RF modulated input signals using a channel mixing matrix to extract N independent data signals transmitted by said second access point**; transmitting an RF modulated signal to said **second access point using a point coordination function (PCF) mode associated with said 802.11 protocol so as to maintain timing compatibility; wherein said multi-signal processor operates with said first baseband processor, in said second mode, to**

transmit an RF modulated signal to the second access point using a point coordination function (PCF) mode associated with the 802.11x protocol so as to maintain timing compatibility; wherein the multi-antenna signal processing circuit is configured to operate operates with a first baseband processor to receive and transmit RF signals in a channel between the first access point and the second access point. 30. A multi-antenna access point circuit comprising: a baseband processor circuit configured to **handle capable of handling data transmissions during a first operating mode in a channel between a first access point and a second access point**; and a multi-antenna signal processing circuit configured to handle capable of **handling data transmissions during a second operating mode in the channe**l, wherein the baseband processor is configured to operate capable of operating with the multi-antenna signal processing circuit, and wherein the baseband processor is configured to handle data transmissions during the first operating mode without multi-antenna signal processing by the multi-antenna signal processing circuit. 31. A multi-antenna access point circuit of claim 30, wherein the multi-antenna signal processing circuit is configured to **receive capable of receiving M independent modulated input signals from the second access point.** 32. A multi-antenna access point circuit of claim 30, wherein the multi-antenna signal processing circuit is configured to process	**receive and transmit RF signals in a channel between said first access point and said second access point.**

capable of **processing the M independent modulated input signals using a channel mixing matrix to extract N independent data signals transmitted by the second access point.** 43. A **communication system** comprising: a media access controller; a baseband processor circuit coupled to said media access controller, said baseband processor being configured to handle capable of **handling data transmissions during a first operating mode in a channel between a first access point and a second access point**; and a multi-antenna signal processing circuit **configured to handle capable of handling data transmissions during a second operating mode in said channel**, wherein the baseband processor circuit is configured to operate capable of operating with the multi-antenna signal processing circuit, and wherein the baseband processor circuit is **configured to handle data transmissions during the first operating mode without multi-antenna signal processing by the multi-antenna signal processing circuit.** 44. A communication system according to claim 43, wherein the multi- antenna signal processing circuit is configured to receive capable of **receiving M independent modulated input signals from the second access point.** 45. A communication system according to claim 43, wherein the multi- antenna signal processing circuit is configured to process capable of **processing the M independent modulated input signals using a channel mixing matrix to extract N independent data signals transmitted by the second access point.**	

Claim 11	Claim 16
11. The circuit of claim 10, wherein the multi-antenna signal processing circuit is configured to process processes data **using a high rate direct sequence spread spectrum (HR/DSSS) physical layer frame structure that has a preamble and header compatible with the 802.11x protocol**.	5. The method of claim 15, wherein said multi-signal processor processes data **using a high rate direct sequence spread spectrum (HR/DSSS) physical layer frame structure that has a preamble and header compatible with said 802.11 protocol.**
Claim 12	Claim 17
12. The circuit of claim 11, wherein the **header includes additional data to identify a high rate mode.**	17. The method of claim 16, wherein said **header includes additional data to identify a high rate mode.**
Claim 13	Claim 18
13. The circuit of claim 11, wherein the **header includes additional data to identify a modulation format.**	18. The method of claim 16, wherein said **header includes additional data to identify a modulation format.**

Allowable Subject Matter

4. **Claims 4, 5, 9, 14-19, 25-29, 33, 36, 38-42 and 46-62** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAIME M. HOLLIDAY whose telephone number is

(571)272-8618. The examiner can normally be reached on Monday through Friday 7:30am to 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Appiah can be reached on (571) 272-7904. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jaime M Holliday/
Examiner, Art Unit 2617

/Charles N. Appiah/
Supervisory Patent Examiner, Art Unit 2617